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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,585	03/31/2004	William H. Whitted	GOOGP022	8421
23689	7590	03/17/2008	EXAMINER	
Jung-hua Kuo			PAPE, ZACHARY	
Attorney At Law				
PO Box 3275			ART UNIT	PAPER NUMBER
Los Altos, CA 94024			2835	
			MAIL DATE	DELIVERY MODE
			03/17/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/816,585	Applicant(s) WHITTED, WILLIAM H.	
	Examiner ZACHARY M. PAPE	Art Unit 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-11, 13-24, 26 and 28-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-11, 13-15, 17-24, 26 and 28-33 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The following detailed action is in response to the correspondence filed 1/14/2008.

Drawings

The objections to the drawings have been withdrawn in view of the amendment to Fig 1 as well as the Applicant's remarks thereto.

Claim Objections

1. Claim 16 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 16 appears to recite the same limitation as that which has been added to claim 13. Given that claim 16 does not appear to further limit claim 13 (Since the limitation has been added directly to claim 13) the Examiner, for the purposes of examination, has not set forth a rejection of claim 16.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 7-9, 11, 23, 26, 28-30, 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. in view of Beitelmal et al. (US 2003/0053293).

With respect to claim 1, Chu et al. teaches a system for cooling electronic components, comprising; a structure (10) defining a plurality of spaces (occupied by 13 and 21), each space having an inlet (To the left of 13 as shown in Fig 9) and an outlet (To the right of 13) and being otherwise generally enclosed and containing at least one of the electronic components (13) mounted therein; at least one heat exchanger (21) being one of adjoining the structure at the inlets of the spaces (As illustrated in Fig 8b) and disposed within the plurality of spaces at the inlets of the spaces, the heat exchanger being configured to channel a heat exchange fluid to cool air as air flows therethrough; a fan (11) disposed in each of the plurality of the spaces (As illustrated in Fig 9) configured to pull air through the inlet via the heat exchanger, to direct air past the at least one electronic component mounted in the space to cool the electronic component, and to exhaust the air through the outlet; and a cooling module (Attached to inlet 41 and exit 42) in fluid communication with the at least one heat exchanger (Via 41 and 42 as illustrated in Fig 8a) for cooling the heat exchange fluid, the cooling module being located remote to the spaces (Since the entrance and exit 41 and 42 are external to the structure and spaces, the cooling module must also be remote to the spaces). Chu et al. fails to teach a fan controller corresponding to each fan, the fan controller being configured to variably control a speed of the corresponding fan according to at

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least one of a temperature within the corresponding space and a temperature of at least one of the at least one electronic component mounted within the corresponding space.

Beitelmal et al. teaches the conventionality of utilizing a fan controller (50) being configured to control a speed of the corresponding fan according to temperature data (Paragraph 33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal et al. with that of Chu 770 to provide substantial supply of cooling fluid individually varied in accordance with actual or anticipated temperatures of heat generating components (Beitelmal: Paragraph 9).

With respect to claim 2, Chu et al. further teaches a plurality of the heat exchangers (21), each heat exchanger corresponding to one of the plurality of spaces (As illustrated in Fig 8b).

With respect to claim 5, Beitelmal et al. teaches the conventionality of using a valve (42)/valve controller (44) combination to control the temperature within a rack (See Beitelmal; paragraphs 31 – 34).

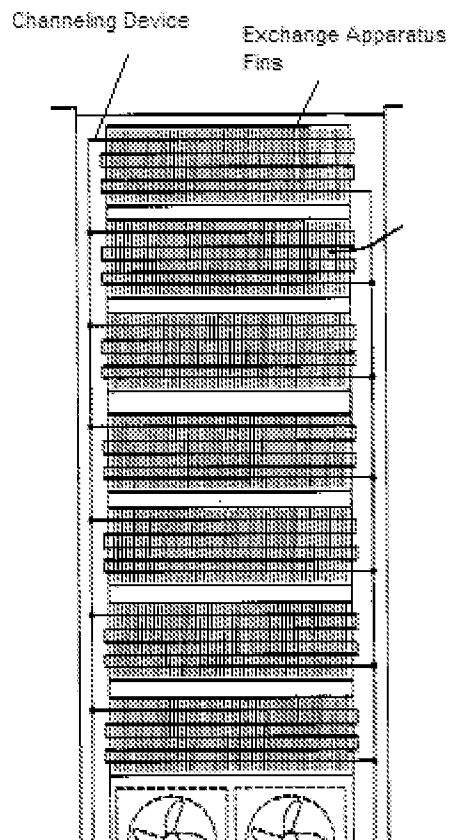
With respect to claim 7, Chu et al. further teaches that the heat exchange fluid is selected from the group comprising water, phase change refrigerants, chilled air, brine, antifreeze mix, and oil (Paragraph 53).

With respect to claim 8, Chu et al. further teaches that each heat exchanger includes a heat exchange fluid channeling device and a heat exchange apparatus in thermal communication with the heat exchange fluid channeling device (See present office action Fig 1 below).

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With respect to claim 9, Chu et al. further teaches that the heat exchange apparatus includes a plurality of heat exchange fins through which the heat exchange fluid channeling device extends (As illustrated in Fig 8a of Chu).

With respect to claim 11, Chu et al. further teaches that the heat exchange fluid channeling device is U-Shaped (As illustrated in Fig 8a) and includes a supply portion (Connected to 41) to supply the heat exchange fluid from the cooling module to the heat exchange apparatus and to return (Via 42) the heat exchange fluid to the cooling module.

**Fig 1**

With respect to claims 23, 26, 28-30, 32 the method steps recited in the claims are inherently necessitated by the device structure as taught by the Chu et al. and Beitelmal et al. references.

With respect to claim 33, the examiner hereby takes official notice that the structure such as the one taught by Chu et al. resides in a facility. To that end, the plurality of heat exchangers (21) of Chu et al. and the fans (11 as shown in Fig 8b) draw ambient air from the facility.

3. Claims 3, 6, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (Hereafter - Chu 770) in view of Beitelmal et al. and further in view of Chu et al (Hereafter - Chu 412).

With respect to claim 3, Chu 770 in view of Beitelmal et al. teaches the limitations of claims 1 and 23 as per above and Chu 770 further teaches that the structure (10) is a rack structure and the electronic components (13) are computer components mounted on shelves of the rack structure (As illustrated in Fig 8b), each shelf corresponding to one of the spaces. Chu 770 fails to specifically teach that the system comprises a plurality of the rack structures. Chu 412 teaches the conventionality of making a system out of a plurality of rack structures (20 – as illustrated in Fig 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 412 with that of Chu 770 and Beitelmal et al. to provide cooling to multiple rack systems.

With respect to claim 6, Chu 770 in view of Beitelmal et al. teaches the limitation of claim 1 above but fails to specifically teach that the cooling module is a direct expansion condensing unit. Chu 796 teaches the conventionality of utilizing a cooling module (60) that is a direct expansion condensing unit. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 796 with that of Chu 770 and Beitelmal et al. to provide a means or mechanism for utilizing multiple heat exchange fluids for optimal transport of thermal energy away from electronic circuit components (Chu 796: Column 2, Lines 59-62).

With respect to claim 24, the method step recited in the claim is inherently necessitated by the device structure as taught by the Beitelmal et al. and Chu et al. references.

4. Claims 13-14, 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Kubota et al. (US 2002/0139554) and further in view of Beitelmal et al.

With respect to claim 13, Chu 770 teaches, a system for cooling electronic components, comprising: means (10) for defining a plurality of spaces, each space having an inlet and an outlet and being otherwise generally enclosed and containing at least one of the electronic components (13) mounted therein; means (21) for cooling air, the means for cooling air being one of adjoining the inlets of the spaces and disposed within the plurality of spaces at the inlets of the spaces; and means (11) for directing the air from ambient air in the means for containing through the inlet to the outlet of the

spaces and past the means for cooling. Chu 770 fails to specifically teach a means for containing a plurality of the means for defining the spaces and means for variably controlling a speed of each fan according to at least one of a temperature within the corresponding space and a temperature of at least one of the at least one electronic component mounted within the corresponding space. Kubota et al. teaches the conventionality of having a second means (1) for containing a plurality of means (4) for defining a plurality of spaces. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Kubota et al. with that of Chu 770 to provide further housing for the means for defining a plurality of spaces. Providing additional housing provides additional protection to the means. With respect to the means for variably controlling, Beitelmal et al. teaches the conventionality of utilizing a fan controller (50) being configured to control a speed of the corresponding fan according to temperature data (Paragraph 33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Beitelmal et al. with that of Chu 770 to provide substantial supply of cooling fluid individually varied in accordance with actual or anticipated temperatures of heat generating components (Beitelmal: Paragraph 9).

With respect to claim 14, Chu 770 further teaches a plurality of the means (21) for cooling air, each means for cooling air corresponding to one of the plurality of spaces (As illustrated in Fig 8b).

With respect to claim 17, Beitelmal et al. teaches the conventionality of using a valve (42)/valve controller (44) combination to control the temperature within a rack (See Beitelmal; paragraphs 31 – 34).

With respect to claim 18, Chu 770 further teaches that the heat exchange fluid is selected from the group comprising water, phase change refrigerants, chilled air, brine, antifreeze mix, and oil (Paragraph 53).

With respect to claim 19, Chu 770 further teaches that the means for cooling air (21) includes a means (As illustrated in the present office action Fig 1 above) for channeling a heat exchange fluid and means (Fins as illustrated in POA Fig 1 above) for channeling the heat exchange fluid extends.

With respect to claim 20, Chu 770 further teaches that the means for heat exchange includes a plurality of heat exchange fins through which the means for channeling the heat exchange fluid extends (As illustrated in POA Fig 1 above).

With respect to claim 21, Chu 770 further teaches that the means for channeling the heat exchange fluid includes an annular channel through which the heat exchange fluid flows.

With respect to claim 22, Chu 770 further teaches that the means for channeling the heat exchange fluid is U-shaped (As illustrated in Chu Fig 8b).

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view of Kubota et al. in view of Beitelmal et al. and further in view of Chu 412.

With respect to claim 15, Chu 770 further teaches that the means for containing is a rack structure and the electronic components are computer components mounted on shelves of the rack structure (As illustrated in Fig 8b), each shelf corresponding to one of the spaces. Chu 770 in view of Kubota et al. and Beitelmal et al. fails to teach that the system comprises a plurality of the rack structures. Chu 412 teaches the conventionality of making a system out of a plurality of rack structures (20 – as illustrated in Fig 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Chu 412 with that of Chu 770, Kubota et al. and Beitelmal et al. to provide cooling to multiple rack systems.

6. Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu 770 in view Beitelmal et al. and further in view of Zhu et al. (US 6,481,492).

With respect to claim 10, Chu 770 in view of Beitelmal et al. teaches the limitations of claim 8 above, but fails to teach that the heat exchange fluid channeling device comprises an external member and an inner baffle defining an annular channel therebetween and through which the heat exchange fluid flows. Zhu et al. teaches the conventionality of utilizing an external member (1) and an inner baffle (2) defining an annular channel (3) therebetween and through which the heat exchange fluid flows. It

would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Zhu et al. with that of Chu 770 and Beitelmal et al. to provide increased efficiency of heat transfer (Zhu: Column 2, Lines 12-16).

With respect to claim 31, the method step recited in the claim is inherently necessitated by the device structure as taught by the Chu 770, Beitelmal et al. and Zhu et al. references.

Response to Arguments

7. Applicant's arguments filed 1/14/2008 have been fully considered but they are not persuasive.

8. With respect to the Applicant's remarks to claims 1, 13, and 23 that, "the use of a temperature of a corresponding space and/or temperature of an electronic component mounted within the corresponding space to control the individual speed of each fan is neither disclosed nor suggested by Beitelmal", the Examiner respectfully disagrees. Chu clearly teaches two fans (14) and a controller for each fan (50) whereby the controllers control the airflow speed. Further Chu teaches in [0031] valve controllers which manipulate valves to increase or decrease airflow based on the actual temperature of heat generating components (I.E. 44, 48 etc.). Finally, Chu teaches in [0033] that the fans (14), controllers (50) and valves (42) all work in conjunction with one another to control the airflow to the components. Therefore Chu clearly teaches fans with corresponding controllers which are configured to variably control a speed of the fan according to the temperature of at least one electronic component as claimed.

9. With respect to the Applicant's remarks that, "Beitelmal fails to disclose or suggest varying the air speed through each of a plurality of spaces within the rack system", the Examiner respectfully disagrees. As Per Fig 2 and [0031-0034] Beitelmal clearly discloses a fan/controller/valve combination which manipulates airflow through a plurality of spaces (i.e. adjacent each valve as per Fig 2).
10. With respect to the Applicant's remarks that, "Beitelmal fails to disclose or suggest the use of a separately controlled fan in each of a plurality of spaces", the Examiner notes Fig 2 which clearly teaches separately controlled fans in a plurality of spaces. Additionally, the combination of Chu and Beitelmal will result in the plurality of fans of Chu being separately controlled as taught by Beitelmal.
11. Finally, the Examiner notes that claim 1 recites, "the fan controller being **configured to** variably control..". The controllers (50) of Beitelmal are clearly configured to perform the function recited in claims 1, 13, and 23 as per [0031-0034].
12. With respect to the Applicant's remarks to claims 3, 6, 10, 13-15, 17-22, 24, and 31 the Examiner directs the Applicant to the response in paragraph 8 above.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZACHARY M. PAPE whose telephone number is (571)272-2201. The examiner can normally be reached on Mon. - Thur. (7:00am - 5:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash Gandhi can be reached on 571-272-3740. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. M. P./
Examiner, Art Unit 2835

/Jayprakash N Gandhi/
Supervisory Patent Examiner, Art Unit 2835